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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/525,779	09/30/2005	Peter Berenbrink	2002P14078WOUS	8492

7590 05/14/2008

Siemens Corporation
Intellectual Property Department
170 Wood Avenue South
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EXAMINER	
PRICE, CARL D	

ART UNIT	PAPER NUMBER
3749	

MAIL DATE	DELIVERY MODE
05/14/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/525,779	BERENBRINK ET AL.	
	Examiner	Art Unit	
	Carl D. Price	3749	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *20-39* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *20-39* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *02/28/2008*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 20-38 are rejected under 35 U.S.C. 102(b) as being anticipated by US **6152724 (Becker).**

US 6152724 (Becker) shows and discloses a burner including:

- a fuel ports (11) in swirl blades located in an annular; and
- a concentration distribution of the fuel in a plane perpendicular to the flow direction;
- wherein the size of the fuel ports (11) increases in the radial direction such that combustion instabilities are reduced as a result of the non-uniform distribution.

In regard to **claim 27, US 6152724 (Becker)** acknowledges that the invention and disclosed burner may include a centrally disposed pilot burner evidenced by the "known from the prior art cited" (see for example elements (12, 14) of US 5435126; cited by **US 6152724 (Becker)**).

In regard to **claim 38,** the burner has a inclined swirl blades (9) (i.e. - the swirl blade having a bladed disk which is wound around a winding axis such that the gas flowing past the swirl blade in the flow direction along an edge of the bladed disk forms an intersecting angle not equal to zero with the flow direction and has different outflow angles)

US 6152724 (Becker) shows and discloses.

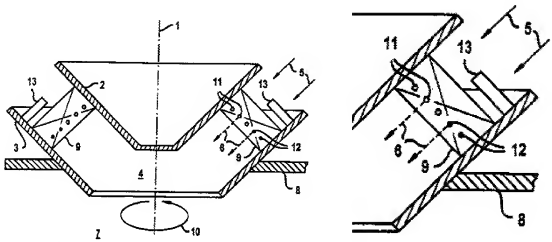

FIG 1

(13) Whether the premix burner embodied as such a device in the individual case requires stabilization by a so-called **pilot flame**, **as known from the prior art cited**, and whether this **pilot flame is disposed in the center** or at the outer periphery of the flow, or whether the premix burner needs a pilot flame at all, is **of secondary importance here**. The same applies to the **configuration of the swirl cascade**; this may be an **axial, radial or diagonal swirl** cascade in accordance with the requirements of the respective individual case. Details for the feeding of the fuel are also of **secondary importance here**; in principle, **the fuel may be fed in any manner**, for example via nozzles in guide blades of the swirl cascade or separate mixing devices in front of or behind the swirl cascade.

(5) **FIGS. 1** and 2 each show a premix burner having an axis 1, an inner body 2 disposed centrically with regard to the axis 1, and an outer body 3 likewise disposed centrically with regard to the axis 1 and surrounding the inner body 2. An annular passage 4 through which a flow 5 of air is directed lies between the inner body 2 and the outer body 3. In the annular passage 4, the air is mixed with fuel 6 to form a mixture, which flows into a combustion space 7 and burns there. An ignition device for igniting the mixture is not shown for the sake of clarity. Within the limits of conventional practice, which prefers a plurality of premix burners for a combustion space 7, an ignition device is not required for each burner, but a single ignition device suffices for all burners. In this sense, an ignition device is therefore not an integral part of an individual premix burner, for which reason the omission of an ignition device from the figures is also justified. The premix burner is let into a combustion space wall 8, which closes off the combustion space 7 upstream of the flow 5. Disposed in the annular passage 4 is a swirl cascade 9 consisting of guide blades 9, which serves to impose a swirl 10 on the flow 5. **Nozzles 11 and 12** are provided in the **guide blades 9** in order to feed the fuel 6 to the flow 5. The device for **feeding the fuel 6 to the nozzles 11 and 12** are not shown for the sake of clarity. A pilot burner, which may possibly be useful or necessary for operating the premix burner and delivers a special flame that helps to stabilize the combustion of the mixture of air and fuel, is also not shown. Such a pilot burner may be necessary if the premix burner is to be operated under fluctuating mixture ratios of air and fuel, since a comparatively lean mixture may possibly no longer ignite in a reliable manner without assistance. As already

explained, whether to use or not to use a pilot burner is at the discretion of the persons skilled and active in the relevant art.

(6) An exemplary embodiment of the invention is shown **in FIG. 1**. Within the scope of the exemplary embodiment, a choke ring 13 consisting of individual bars attached to the outer body 3 and projecting into the annular passage 4 is provided in front of the swirl cascade 9. The bars cause local pressure losses in the flow 5 and lead to the outer portion of the flow 5, which passes close to the outer body 3, being slowed down or delayed relative to other portions of the flow 5. The slowing down continues through the entire annular passage 4 and leads to a non-uniform distribution of the velocity in the mixture, which flows off into the combustion space 7. This results in the **stabilizing effects,** already described at the beginning, on the combustion taking place in the combustion chamber 7, to the above explanation of which reference is hereby made. The feeding of the fuel 6 to the flow 5 must take into account the non-uniform distribution of the velocity in the flow 5. Therefore, **large nozzles 11** are provided for feeding the fuel to the largely unaffected portion of the flow and **small nozzles 12** are provided for feeding the fuel 6 to the **slowed-down portion of the flow 5. The dimensions of the nozzles 11 and 12 are to be selected in such a way that a largely homogeneous distribution of the fuel in the flow is achieved and thus combustion having as low a production of nitrous oxide as possible is ensured. For appropriate construction of the device, computer programs for the numerical modeling of the flow 5 are available to the persons skilled and active in the relevant art, the utilization of which computer programs permits an appropriate configuration of the nozzles 11 and 12.**

(8) To **stabilize the combustion** of a premix burner, it has been proposed to envelope the igniting mixture flowing from the burner with a veil of air and thus prevent vortices from forming in marginal regions of the mixture, in which vortices combustion processes take place, from which it may be assumed that they contribute substantially to the destabilization of the combustion. However, a disadvantage of the proposed measure may be seen in the fact that the air which is used to envelope the mixture has to be extracted from the actual combustion operation. If the thermal output to be released by the premix burner is fixed, the quantity of fuel to be used is also essentially fixed, and a withdrawal of air for stabilizing the combustion results in the actual combustion taking place in the presence of a reduced quantity of air and, in view of the fact that the combustion, in particular in a **gas-turbine plant,** is effected as a rule with excess air, must proceed with a markedly increased maximum temperature and thus with a markedly increased formation of nitrous oxides.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over **US 6152724 (Becker)** in view of **US 5647200 (Althaus).**

US 6152724 (Becker) shows and discloses the invention substantially as set forth in the claims (see the discussion herein above) with possible exception to:

- wherein the burner has a radial direction disposed perpendicularly to the burner longitudinal axis and the outflow angle of a gas flowing past a swirl blade in the radial direction has different outflow angles at the swirl blade with the outflow angle decreasing in the radial direction from the interior to the exterior.

US 5647200 (Althaus) teaches, from the same burner field of endeavor as **US 6152724 (Becker),** forming a fuel injector swirl blade with the outflow angle decreasing (oppositely angled) in the radial direction from the interior to the exterior, for the purpose of forming a stable back-flow zone in the combustion area.

US 5647200 (Althaus) shows and discloses:

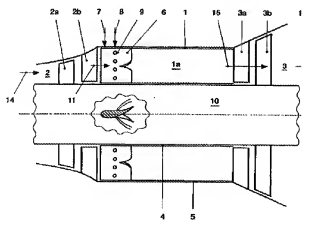

FIG. 1

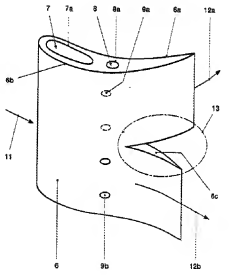

FIG. 2

(2) … With arrangements of this type it is necessary to take precautions that the flame front from the combustion chamber 1a of the heat generator 1 cannot migrate upstream, i.e. flash-back of the flame in

the direction toward the high-pressure turbine 2 must be prevented. It would be disadvantageous here to provide any flame traps downstream of the high-pressure turbine 2. Considering what has already been pointed out, the support herein proposed therefore assumes the function of a vortex generator by means of a special design, which is able to form a **stable back-flow zone**. …

(3) FIG. 2 shows the support 6 in a perspective view. Intrinsically, the support 6 has the shape of a guide vane. In the place where the combustion air 11 flows in, the support 6 has an interior conduit 7a, through which the air 7, described in connection with FIG. 1 flows. A further conduit 8a is disposed along a plane at approximately the center of the flow, through which **the fuel 8 flows.** The support 6 in the form of a guide vane is divided by a notch 13, which divides the support into two diverging portions. In the direction of flow this includes approximately the rear half of the guide vane in such a way that the upper half of the guide vane has an uninterrupted profiling of the **underpressure surface 6a** and the **overpressure surface 6b,** while the lower rear half of the guide-vane-shaped support 6 is offset in relation to this, i.e. the profile of the overpressure surface 6b makes a transition into the underpressure surface 6c. The flow 11 impacting on the support 6 is split at the beginning of the offset notch 13 **into two diverging partial flows 12a, 12b**. Fuel nozzles 9a, 9b, shown here by means of openings, act in the area of the beginning notch 13. The fuel 8 supplied through the conduit 8a and, if required, mixed with or supported by air, flows through these fuel nozzles into the combustion chamber 1a of the heat generator 1 and there triggers self-ignition by means of the hot combustion air 11. The fuel nozzles 9a, 9b are evenly distributed within the radial extent of the support 6, either **on both sides** of the support 6 or only on the respective underpressure sides 6a, 6c, as can be seen in FIG. 2. The vortices generated in the flow direction by the diverging portions of the support not only accelerate the mixture of fuel 8 and combustion air 11 in the near area of the support, which **triggers a short mixing length and** accordingly direct self-ignition, but in the remote area, i.e. in the further combustion chamber 1a of the heat generator 1, they also additionally **smooth out the concentration and temperature differences** which are **responsible for an increase in noxious matter emissions.** Viewing this from the point of efficiency it can be said that the said compensation operates with minimal pressure losses, which results in an increased output of the downstream turbine. It is of course also possible to provide intermittent underpressure surfaces, i.e. a plurality of notches 13, over the height of the support 6 in connection with a desired vortex generation.

In regard to **claim 39**, for the purpose of creating a stable back flow area so that the flame front from the combustion chamber cannot migrate upstream, it would have been obvious to a person having ordinary skill in the art to form the swirl blades of **US 6152724 (Becker)** such that outflow angle decreases in the radial direction from the interior to the exterior, in view of the teaching of **US 5647200 (Althaus).**

Conclusion

See the attached USPTO for, 892 for prior art made of record and not relied upon which is considered pertinent to applicant's disclosure.

USPTO CUSTOMER CONTACT INFORMATION

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Carl D. Price whose telephone number is (571) 272-4880. The examiner can normally be reached on Monday through Friday between 9:00am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven B. McAllister can be reached on (571) 272-6785. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Carl D. Price/
Primary Examiner, Art Unit 3749

cp